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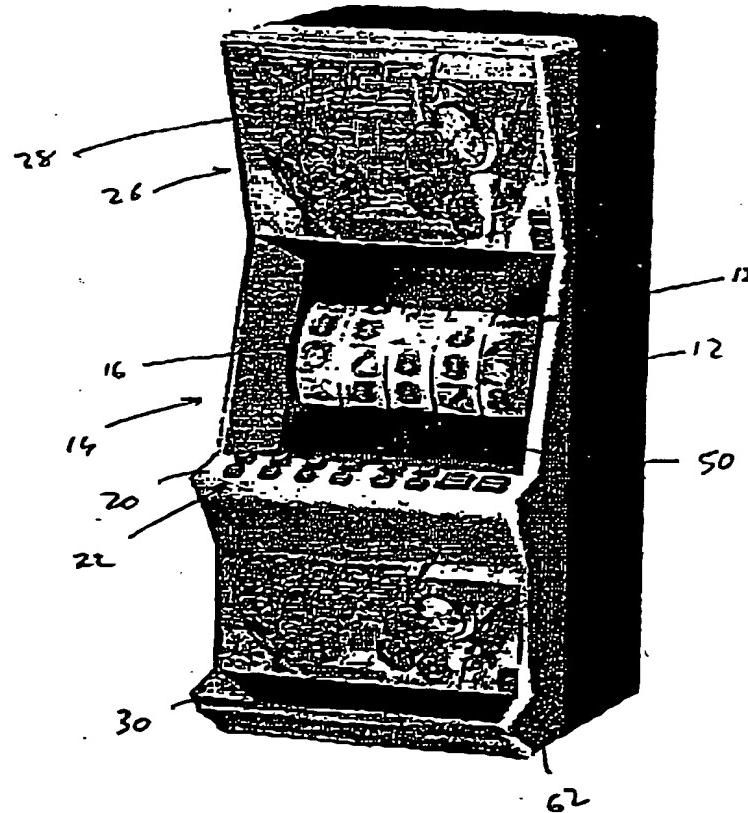
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(54) Title: GAMING MACHINE DISPLAY



(57) Abstract: A gaming machine display (14) includes a game playing arrangement (16) mountable in a cabinet (62) of a gaming machine (10). An electronically controlled display element (50) overlays the game playing arrangement (16) so that, depending on a state of the display element (50), the game playing arrangement (16) is visible through the display element (50).

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Gaming machine display

Field of the Invention

This invention relates to a gaming machine. More particularly, the invention relates to a gaming machine display, to a display means for a gaming machine display and to a method of displaying images on a gaming machine.

Background to the Invention

Players who regularly play gaming machines are, increasingly, demanding more features on the gaming machines. Venues which make use of gaming machines as a source of revenue also desire enhanced gaming machines to attract players to improve their source of revenue.

Various ways of enhancing gaming machines by means of the games played thereon have been proposed by the applicant.

However, in general, few changes have been made to the gaming machines themselves, apart from changes to cabinet design, or the like, in an attempt to modernise the appearance of the gaming machine and to enhance images displayed on a primary display of the gaming machine.

In addition, it is becoming increasingly popular to provide bonus events in the form of second screen features. Such second screen features may occur on a secondary display of the gaming machine. Where the secondary display is vertically spaced with respect to the primary display of the gaming machine, it requires a player to adopt a different vertical, viewing orientation. This can become taxing to a player leading to fatigue and, potentially, muscle pain. As a result the player's enjoyment of the gaming activity is reduced leading to the player's activity being curtailed. This defeats the purpose of adding the additional features to attract and retain players.

Summary of the invention

According to a first aspect of the invention, there is provided a gaming machine display which includes:

a game playing arrangement mountable in a cabinet of a gaming machine; and

an electronically controlled display means overlying the game playing arrangement, in use, so that, depending on a state of the display means, the game playing arrangement is visible through the display means.

Preferably, the game playing arrangement comprises an electro-mechanical, symbol carrying arrangement. The symbol carrying arrangement may comprise a set of rotatable mechanical reels, a plurality of symbols being arranged on an outer periphery of each reel.

- 5 The display means may comprise a display screen overlying the game playing arrangement. Preferably, the display screen is a multi-layered structure.

The structure may include a monitor on which images are to be displayed. In this specification, the term "monitor" is to be understood in a broad sense as any device on which varying images are displayed. In a preferred embodiment of the invention, the monitor is a flat panel, liquid crystal display (LCD).

10 The monitor may overlie a shutter mechanism. The shutter mechanism may be an electronically controlled device that is controllable to vary between a transparent state, in which the game playing arrangement is visible through the device, and an at least partially opaque state, in which the game playing arrangement is at least partially occluded. The shutter mechanism may be formed of electrically responsive crystals which change phase depending on a control signal applied to them. Thus, for example, the shutter mechanism may 15 be formed of nematic curvilinear aligned phase (NCAP) liquid crystals.

15 The display may include a monitor housing defining a plurality of openings, one opening being associated with each reel, a part of the outer periphery of each reel being visible through its associated opening.

20 The electronically controlled device may therefore define a plurality of zones, each zone, in use, overlying one of the openings of the monitor housing and, hence, one of the reels, and each zone being controllable to vary between the transparent state, in which the associated reel is visible through that zone, and an at least partially opaque state, in which said reel is at least partially 25 occluded.

25 A user interface layer may overlie the monitor. The user-interface layer may be implemented as a touchscreen. The touchscreen may employ surface acoustic wave technology.

30 In a preferred embodiment of the invention, the multi-layered structure may include an illuminating layer for illuminating the monitor. The illuminating 35 layer may comprise a light transferring panel and an illuminating means arranged adjacent at least one edge of the panel. The panel may be a panel of

a synthetic plastics material that is interposed between the monitor and the shutter mechanism.

In another embodiment of the invention, the game playing arrangement may be illuminated to render it visible through the monitor. The intensity of the illumination may be adjustable for adjusting the degree of visibility of the game playing arrangement through the monitor. In other words, by adjusting the illumination, the effect is created of adjusting the transparency of the monitor.

The monitor may be arranged in spaced relationship relative to the game playing arrangement such that, when an image appears on the monitor, it imparts a three-dimensional effect to a scene comprising the game playing arrangement and the image on the monitor. For example, win lines may be indicated on the monitor after a win occurs. The win lines may be animated over the top of those symbols of the game playing arrangement which make up the winning combination or winning combinations to highlight the win or wins, as the case may be.

In another embodiment of the invention, instead of the multi-layered structure, the display means may be a flat panel display, more particularly, a flat panel, liquid crystal display, alone.

According to a second aspect of the invention, there is provided a display means for a gaming machine display, the display means including:

a monitor on which images are to be displayed; and
a shutter mechanism underlying the monitor, the shutter mechanism being controllable to vary between a transparent state, in which other images underlying the shutter mechanism, in use, are visible through the monitor, and an at least partially transparent state in which the other images are at least partially occluded when viewed through the monitor.

The display means may be a multi-layered structure having a user-interface layer overlying the monitor. The multi-layered structure may include an illuminating layer operatively arranged relative to the monitor to illuminate the monitor.

According to a third aspect of the invention, there is provided a method of displaying images on a gaming machine, the method including the steps of:

displaying a first set of images on a game playing arrangement mounted in a cabinet of the gaming machine; and
35 displaying at least one further image on a display means overlying the game playing arrangement.

Preferably, the method includes controlling a state of the display means to control its transparency to regulate a degree of visibility, if any, of the game playing arrangement through the display means.

- In addition, the method may include displaying at least one further image 5 overlying an image of the game playing arrangement, said at least one further image being taken into account in determining an outcome of a game played on the gaming machine.

- To enhance the appearance of the images, the method may include illuminating the display means to enhance the display of said at least one 10 further image on the display means.

The method may include displaying the at least one further image on the display means as a moving animation. In addition, the method may include controlling the display of the at least one further image on the display means to provide an effective change in camera angle or a zooming in or out effect.

- 15 The invention extends also to a gaming machine which includes a gaming machine display, as described above.

Brief Description of the Drawings

- The invention is now described by way of example with reference to the 20 accompanying diagrammatic drawings in which:-

Figure 1 shows a perspective view of a gaming machine, in accordance with the invention;

Figure 2 shows a block diagram of a control circuit of the gaming machine;

- 25 Figures 3 to 5 show three-dimensional views of part of the gaming machine with an animated image on a display means of a display of the gaming machine;

Figure 6 shows a schematic representation of a first example of a screen display of the gaming machine;

- 30 Figure 7 shows a schematic representation of a second example of a screen display of the gaming machine;

Figure 8 shows a three dimensional, exploded view of a gaming machine display in accordance with another embodiment of the invention; and

- 35 Figure 9 shows a flow chart of a game played on the gaming machine of Figure 1.

Detailed Description of the Drawings

In Figure 1, reference numeral 10 generally designates a gaming machine including a display 14, in accordance with the invention. The machine 10 includes a cabinet 12 housing the display 14.

- 5 The display 14 includes a game playing arrangement, or symbol carrying arrangement, 16 in the form of a plurality of mechanical reels 18 with each reel 18 carrying a plurality of symbols on an outer periphery of the reel 18. The reels 18 are used to play a spinning reel game.

A midtrim 20 of the machine 10 houses a bank 22 of buttons for enabling 10 a player to play the game. The midtrim 20 also houses a credit input mechanism 24 (Figure 2).

The machine 10 includes a top box 26 on which artwork 28 is carried. The artwork 28 includes paytables, details of bonus awards, etc.

A coin tray 30 is mounted beneath the cabinet 12 for cash payouts from 15 the machine 10.

Referring to Figure 2 of the drawings, a control means or control circuit 40 is illustrated. A program which implements the game and user interface is run on a processor 42 of the control circuit 40. The processor 42 forms part of a controller 44 which drives the reels 18 of the symbol carrying arrangement 16 20 and which receives input signals from sensors 46 associated with the bank 22 of buttons and sensors 46 associated with a touchscreen of the display 14.

The controller 36 also receives input pulses from the credit input mechanism 24 to determine whether or not a player has provided sufficient credit to commence playing.

25 Finally, the controller 42 drives a payout mechanism 48 which, for example, may be a coin hopper for feeding coins to the coin tray 30 to make a pay out to a player when the player wishes to redeem his or her credit.

The display 14 includes a second display means in the form of a flat panel, liquid crystal display (LCD) 50 mounted operatively in front of the symbol 30 carrying arrangement 16 so that the symbol carrying arrangement 16 is visible through the LCD 50.

In the embodiment shown in Figures 3 to 5 of the drawings, the LCD 50 is an at least partially transparent display and carries at least one image 52 under certain circumstances thereon. In particular, the image 52 is related to 35 the underlying spinning reel game played on the symbol carrying arrangement 16.

As indicated above, the LCD 50 is at least partially transparent so that images or symbols carried on the reels 18 of the symbol carrying arrangement 16 are visible through the LCD 50.

- In use, when a predetermined trigger condition occurs, at least one image 52 is displayed on the LCD 50. The image 52 may be related to the underlying base game which uses the symbol carrying arrangement 16. For example, as shown in Figures 6 and 7 of the drawings, when a particular trigger condition occurs in the base game, a "wild card" symbol 54 is displayed on the LCD 50, overlying one of the symbol positions on one of the reels 18. When the reels 18 stop spinning, the symbol 54 substitutes for the underlying symbol on the relevant reel 18. In the example shown in Figure 6 of the drawings, the symbol 54 is transparent so that the underlying reel symbol is visible through the symbol 54. In the example shown in Figure 7 of the drawings, the symbol 54 is opaque so that the underlying reel symbol position is covered and is hidden by the symbol 54 on the LCD 50. It will be appreciated that the above-described example could apply to a base game and/or to a special feature game.

In addition, the LCD 50 can be used for displaying messages as an attracting unit for attracting patrons to the machine 10. Further, the LCD 50 can be used for a second screen feature which is triggered when a trigger condition is spun up on the reels 18 of the symbol carrying arrangement 16. Still further, the LCD 50 could be used to carry advertising material which may be displayed when a game is not being played or could also be displayed while a game is being played.

If desired, the image 52 carried on the LCD 50 could overlie one of the symbol positions on one of the reels 18 to create a three-dimensional effect. Then, the controller 44 may be operable to vary "camera angles" and to provide a "zooming in or out effect" to enhance the three-dimensional effect.

Referring to Figure 8 of the drawings, a display 14, in accordance with a second embodiment of the invention is illustrated. With reference to the previous drawings, like reference numerals refer to like parts, unless otherwise specified.

The LCD 50 is a multi-layered structure overlying the symbol carrying arrangement 16.

For this purpose, the display 14 includes a monitor housing 60 which, in use, is secured to a door 62 (Figure 1) of the gaming machine 10. The monitor

housing 60 defines a plurality of apertures or openings 64. Each opening 64 of the monitor housing 60 is associated with one of the reels 18 of the symbol carrying arrangement 16.

The monitor housing further defines a recessed region 66 within which
5 the LCD 50 is received.

The LCD 50 is a multi-layered structure and includes a glass panel LCD monitor 68. A user interface in the form of a touchscreen 70 is superimposed on the monitor 68.

The monitor 68 and the touchscreen 70 are connected via connectors
10 72, 74, respectively, to the controller 42 of the gaming machine 10.

The touchscreen 70 employs surface acoustic wave technology. Frets bound the touchscreen 70 and discern energy field disturbances. These disturbances are interpreted by the frets as decisions made coincident with touching the touchscreen 70 and the position at which the touchscreen 70 was
15 touched.

The LCD 50 include a shutter mechanism 76 interposed between the monitor 68 and the monitor housing 60. The shutter mechanism 76 has zones or regions 78 which, in use, lie in register with the openings 64 in the monitor housing 60 and, accordingly, in register with those parts of the peripheries of
20 the reels 18 visible through the openings 64.

At least the zones 78 of the shutter mechanism 76 are formed from a material responsive to varying energy levels. In particular, the zones 78 are formed from nematic curvilinear aligned phase (NCAP) liquid crystals.

Upon the application of appropriate energy levels, these NCAP crystals
25 either render the zones 78 optically transparent allowing visual access to the parts of the reels 18 visible through the openings 64 in the monitor housing 60 or can be rendered opaque to form a background shutter for the LCD monitor 68 allowing the LCD monitor 68 to carry images with the reels 18 being hidden. In addition, the varying of the energy levels applied to the zones 78 of the
30 shutter mechanism 76 allows varying degrees of transparency of those zones 78 to be achieved. The zones 78 of the shutter mechanism 76 are controlled by the controller 42 of the gaming machine 10 via a connector 80.

While it is envisaged that all of the zones 78 will operate in concert, it is also contemplated that the zones 78 could be independently addressable such
35 as when a bonus round uses one or more of the reels 18 in the bonus event.

As a consequence, a gaming machine 10 is provided which includes a first display, being the symbol carrying arrangement 16, which can be selectively occluded by the second display being the LCD 50. The net effect is that a plurality of displays are stacked along a single visual path which reduces

5 a visual footprint required to provide such plurality of displays. This also frees other areas of the cabinet 12 of the gaming machine 10 for other devices, artwork, or the like.

The visual impact imparted by the LCD 50 is enhanced by an illuminating layer in the form of a backlighting arrangement 82. The backlighting

10 arrangement 82 includes a transparent panel 84 of a synthetic plastics material which, conveniently, is interposed between the monitor 68 and the shutter mechanism 76. The panel 84 supports a pair of opposed illuminating elements 86. The elements 86 can, for example, be in the form of fluorescent lamps. Additionally, illuminating elements (not shown) can be incorporated in the reels

15 18 for further visual enhancement.

With the provision of the display 14, it is possible for game play to be effected using the LCD 50 alone, the symbol carrying arrangement 16 on its own or both the LCD 50 and the symbol carrying arrangement 16. It is also contemplated that more than one LCD 50 could be incorporated in the display

20 14 with second and subsequent LCD's overlying the first LCD 50 of the display 14 in the same visual footprint.

Accordingly, it is an advantage of the invention that a gaming machine 10 is provided which has an enhanced display 14 in comparison with other gaming machines, in particular, those using mechanical reels 18 or other

25 mechanical game playing arrangements such as pachinko machines, or the like.

Moreover, the display 14 is at the position of the primary display of a conventional gaming machine. It will be appreciated that, in general, there is only one optimal position at which to locate a display of a gaming machine.

30 Most gaming machines are ergonomically designed so that the display of the gaming machine is at that optimal position for a person of average height. Thus, the enhanced display 14 of the present invention can be arranged at that optimal height with the added benefit that a feature game can be played on the LCD screen 50 at that height.

35 It will be appreciated by persons skilled in the art that numerous variations and/or modifications may be made to the invention as shown in the

specific embodiments without departing from the spirit or scope of the invention as broadly described. The present embodiments are, therefore, to be considered in all respects as illustrative and not restrictive.

CLAIMS:

1. A gaming machine display which includes:
 - a game playing arrangement mountable in a cabinet of a gaming machine; and
 - 5 an electronically controlled display means overlying the game playing arrangement, in use, so that, depending on a state of the display means, the game playing arrangement is visible through the display means.
2. The display of claim 1 in which the game playing arrangement comprises
 - 10 a mechanical, symbol carrying arrangement.
3. The display of claim 2 in which the symbol carrying arrangement comprises a set of rotatable mechanical reels, a plurality of symbols being arranged on an outer periphery of each reel.
 - 15 4. The display of claim 3 in which the display means comprises a display screen overlying the game playing arrangement.
 5. The display of claim 4 in which the display screen is a multi-layered
 - 20 structure.
 6. The display of claim 5 in which the structure includes a monitor on which images are to be displayed.
 - 25 7. The display of claim 6 in which the monitor overlies a shutter mechanism.
 8. The display of claim 7 in which the shutter mechanism is an electronically controlled device that is controllable to vary between a
 - 30 transparent state, in which the game playing arrangement is visible through the device, and an at least partially opaque state, in which the game playing arrangement is at least partially occluded.
 9. The display of claim 8 which includes a monitor housing defining a
 - 35 plurality of openings, one opening being associated with each reel, a part of the outer periphery of each reel being visible through its associated opening.

10. The display of claim 8 or claim 9 in which the electronically controlled device defines a plurality of zones, each zone, in use, overlying one of the reels and each zone being controllable to vary between the transparent state, in 5 which the associated reel is visible through that zone, and an at least partially opaque state, in which said reel is at least partially occluded.

11. The display of any one of claims 6 to 10 in which a user interface layer overlies the monitor.

10

12. The display of any one of claims 6 to 11 in which the multi-layered structure includes an illuminating layer for illuminating the monitor.

15

13. The display of claim 12 in which the illuminating layer comprises a light transferring panel and an illuminating means arranged adjacent at least one edge of the panel.

14. The display of claim 1 in which the display means is a flat panel display.

20

15. A display means for a gaming machine display, the display means including:

25

a monitor on which images are to be displayed; and

a shutter mechanism underlying the monitor, the shutter mechanism

being controllable to vary between a transparent state, in which other images 25 underlying the shutter mechanism, in use, are visible through the monitor, and an at least partially transparent state in which the other images are at least partially occluded when viewed through the monitor.

15. The display means of claim 14 which is a multi-layered structure having 30 a user-interface layer overlying the monitor.

16. The display means of claim 14 or claim 15 in which the multi-layered structure includes an illuminating layer operatively arranged relative to the monitor to illuminate the monitor.

17. A method of displaying images on a gaming machine, the method including the steps of:

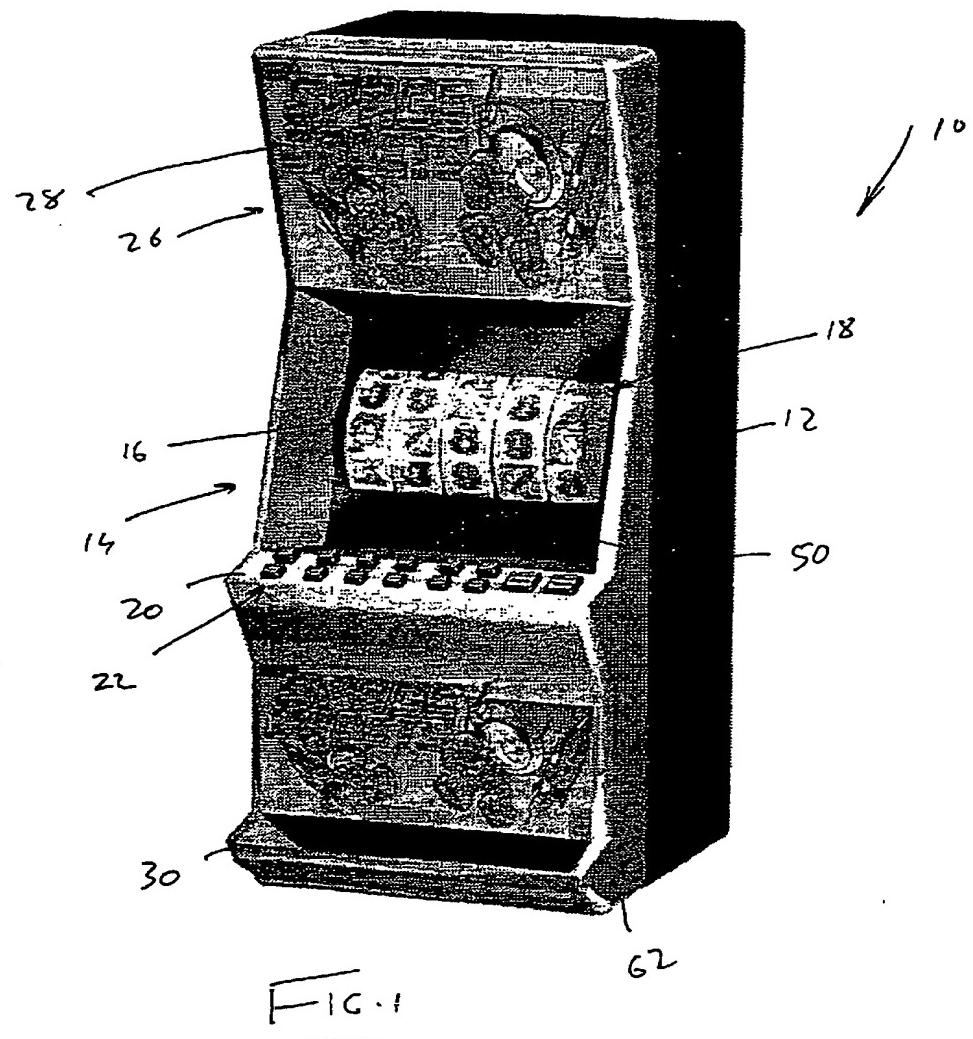
displaying a first set of images on a game playing arrangement mounted in a cabinet of the gaming machine; and

5 displaying at least one further image on a display means overlying the game playing arrangement.

18. The method of claim 17 which includes controlling a state of the display means to control its transparency to regulate a degree of visibility, if any, of the
10 game playing arrangement through the display means.

19. The method of claim 17 or claim 18 which includes displaying at least one further image overlying an image of the game playing arrangement, said at least one further image being taken into account in determining an outcome of
15 a game played on the gaming machine.

20. The method of any one of claims 17 to 19 which includes illuminating the display means to enhance the display of said at least one further image on the display means.



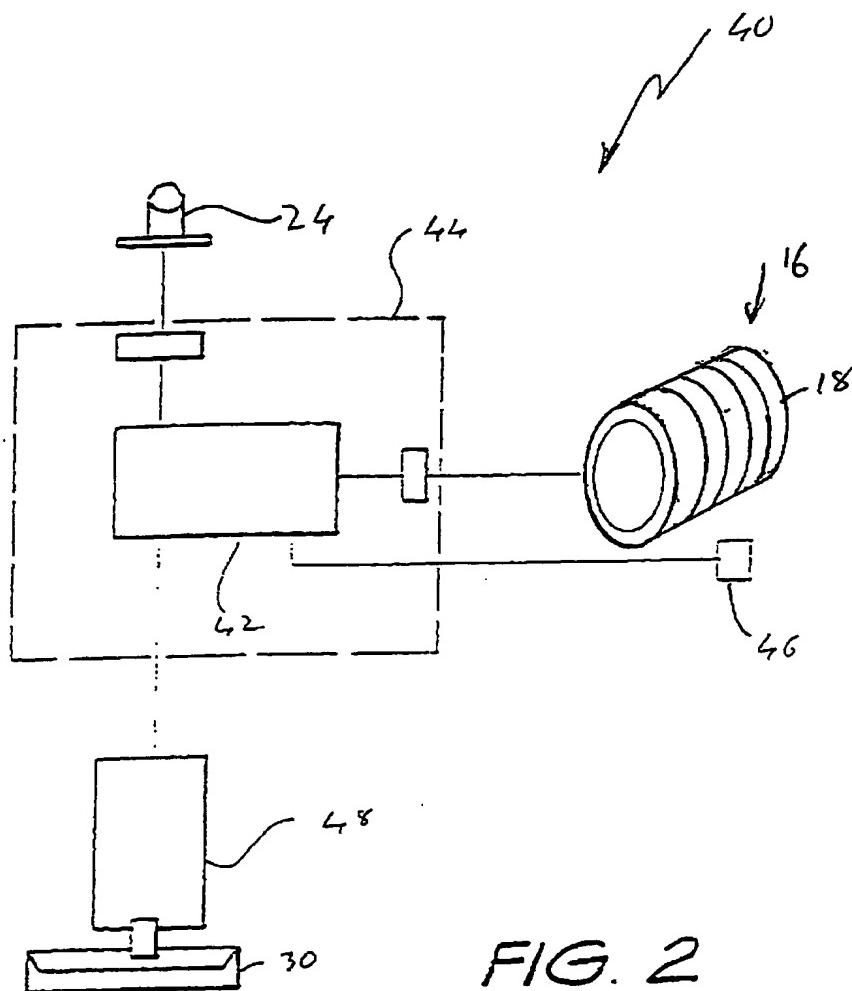


FIG. 2

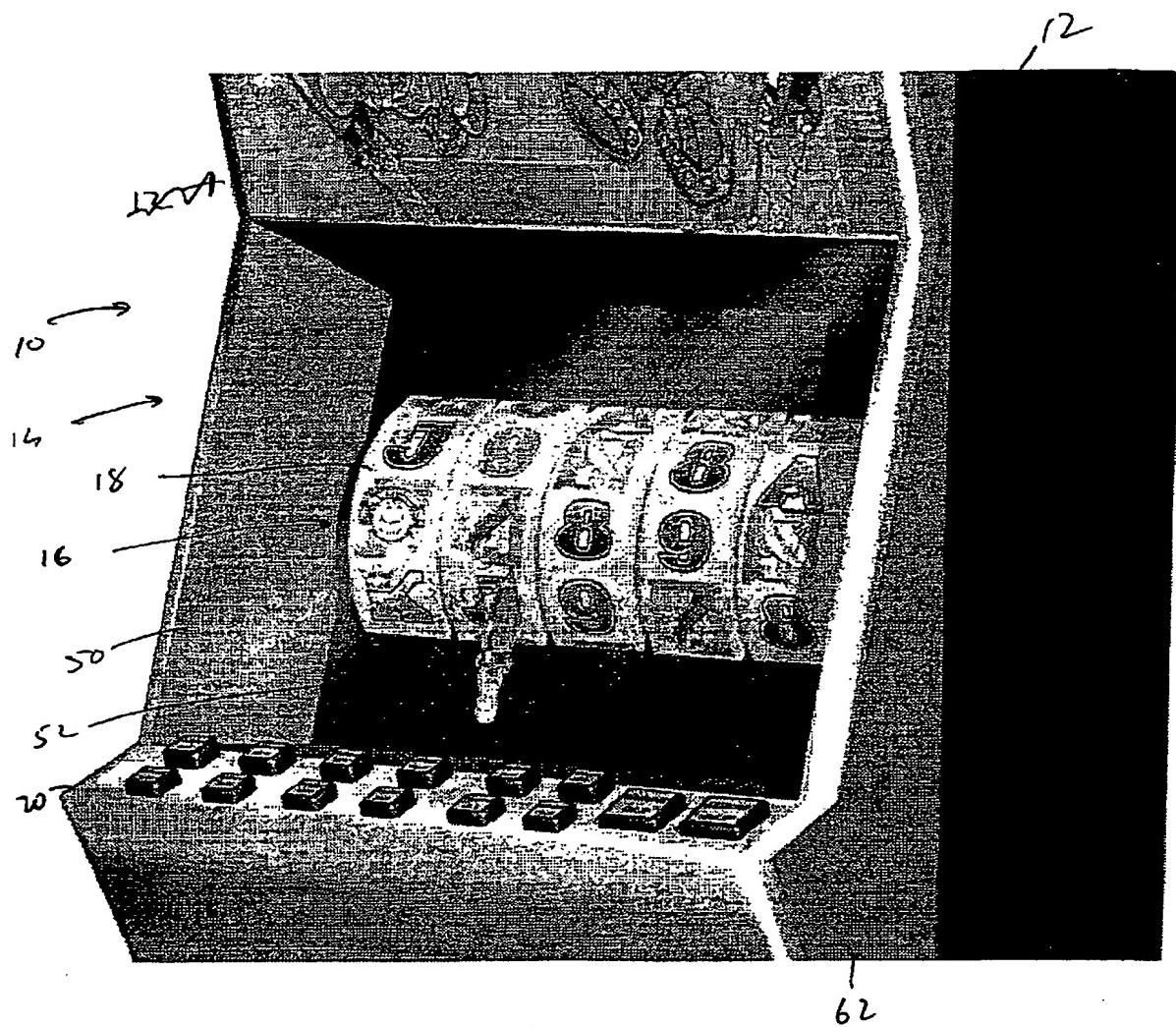


Fig. 3

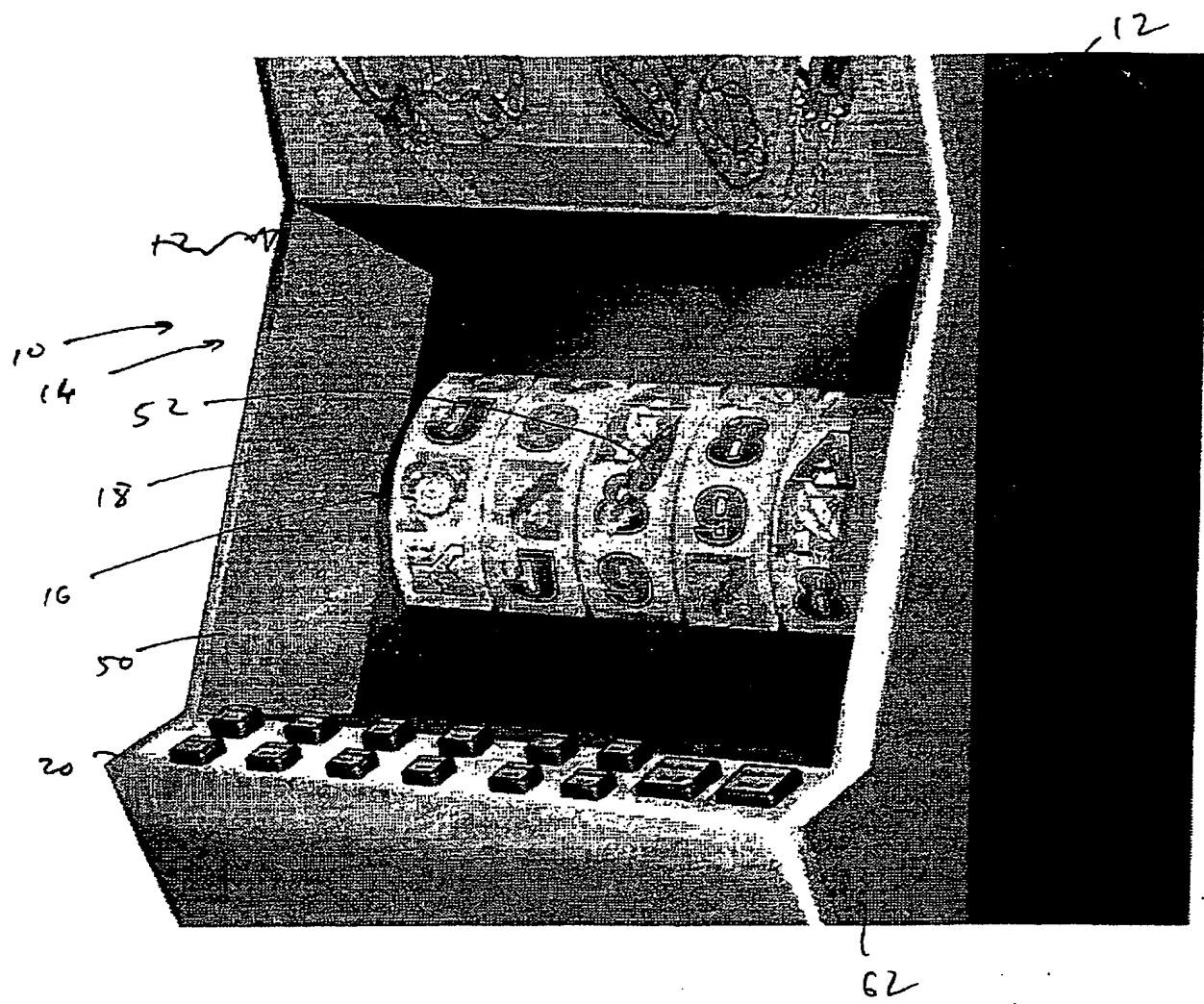
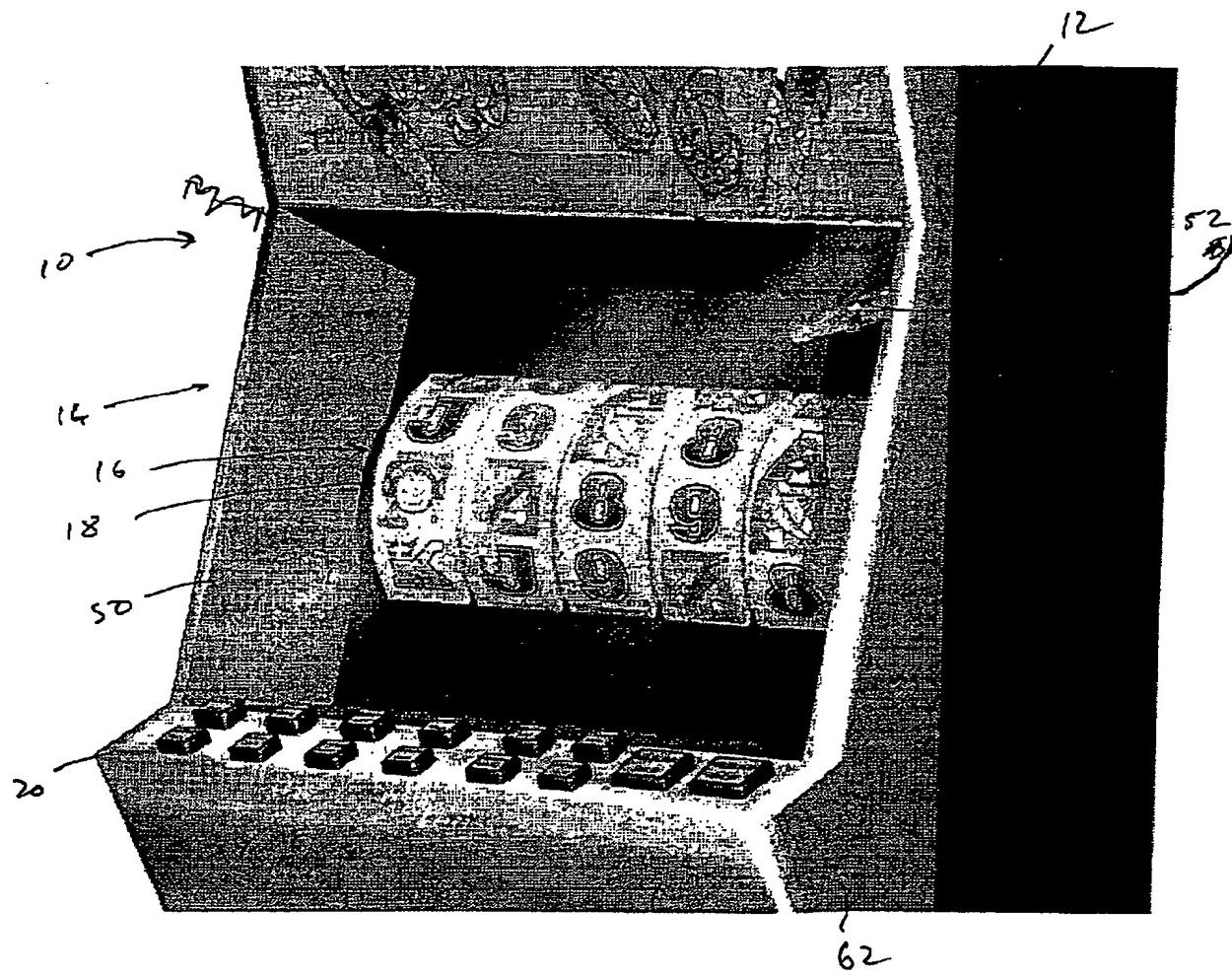


FIG. 4



54

K	J BONUS	Q	9	10
Q	10	K	10	K
J	K	J	K	S

14

54

FIG. 6

Q	BONUS	Q	Q	Q
9	J	K	9	10
K	9	10	K	9

14

FIG. 7

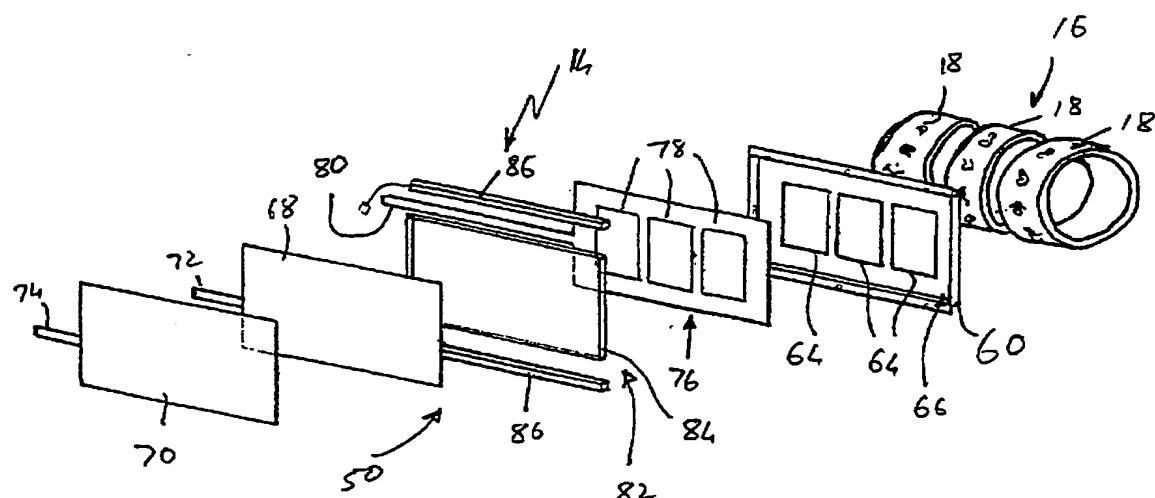


FIG. 8

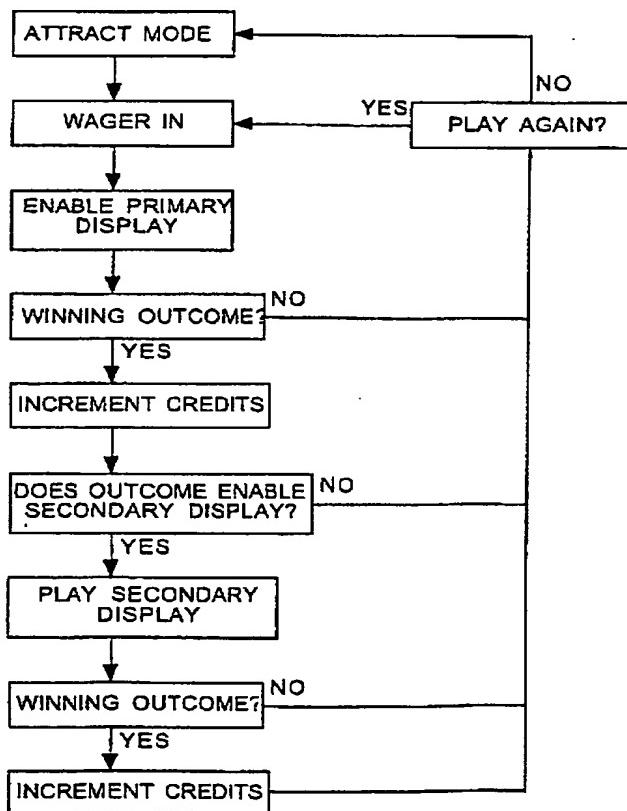


FIG. 9

INTERNATIONAL SEARCH REPORT

International application No.
PCT/AU02/01462

A. CLASSIFICATION OF SUBJECT MATTER		
Int. CL ?: A63F 13/00, G07F 17/34		
According to International Patent Classification (IPC) or to both national classification and IPC		
B. FIELDS SEARCHED		
Minimum documentation searched (classification system followed by classification symbols)		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) DWPI & keywords: game, poker, fruit, slot, machine, display, monitor, screen, LCD, overlie, underlie, superimpose, above.		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	Patent Abstracts of Japan, JP, 8-117409 A (HEIWA CORP) 14 May 1996 whole abstract	1 - 20
A	Patent Abstracts of Japan, JP, 10-099483 A (TAKASAGO ELECTRIC IND CO LTD) 21 April 1998 whole abstract	1 - 20
A	Patent Abstracts of Japan, JP, 10-208025 A (NAMCO LTD) 7 August 1998 whole abstract	1 - 20
<input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C		<input checked="" type="checkbox"/> See patent family annex
<p>* Special categories of cited documents:</p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"B" earlier application or patent but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> <p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone</p> <p>"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art</p> <p>"&" document member of the same patent family</p>		
Date of the actual completion of the international search 18 November 2002	Date of mailing of the international search report 27 NOV 2002	
Name and mailing address of the ISA/AU AUSTRALIAN PATENT OFFICE PO BOX 200, WODEN ACT 2606, AUSTRALIA E-mail address: pct@ipaustralia.gov.au Facsimile No. (02) 6285 3929	Authorized officer B. NGUYEN Telephone No : (02) 6283 2306	

INTERNATIONAL SEARCH REPORT

International application No. PCT/AU02/01462

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	Patent Abstracts of Japan, JP, 2000-325597 A (SOPHIA CO LTD) 28 November 2000 whole abstract	1 - 20
A	Patent Abstracts of Japan, JP, 2001-029590 A (ACE DENKEN:KK) 6 February 2001 whole abstract	1 - 20

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/AU02/01462

This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent Document Cited in Search Report			Patent Family Member
JP	08-117409	NONE	
JP	10-099483	NONE	
JP	10-208025	US 6429874	
JP	12-325597	NONE	
JP	13-029590	NONE	END OF ANNEX